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(56) Documents Cited

GB 2200086 A GB 1592454 A GB 1317381 A
GB 1171773 A WO 89/11979 A1 US 5168957 A
US 4884207 A

(58) Field of Search

UK CL (Edition L) F1B , F2V VS20
INT CL⁵ B60R 25/04 , F16K 31/06 31/08

(54) Anti-theft vehicle engine fuel valve

(57) A magnetic piston 18 seated by fuel pressure is moved to permit fuel flow to an outlet pipe 12 in response current flow through the coil 20. Fuel flows through a circular array of passages 32 between inlet and outlet grooves 30, 28. The coil 20 is energised by a hidden switch, input to a keyboard, insertion of a card into a reader or in response to a radio, infra-red or audio transmitter/receiver arrangement.

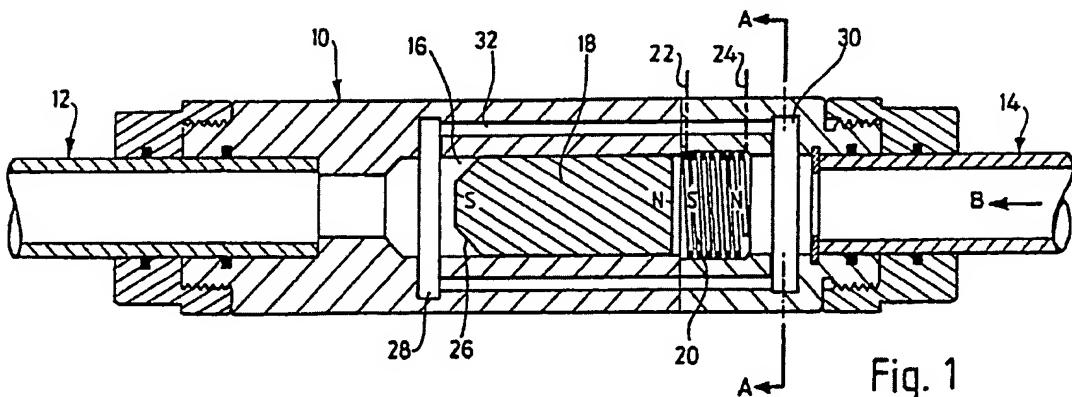


Fig. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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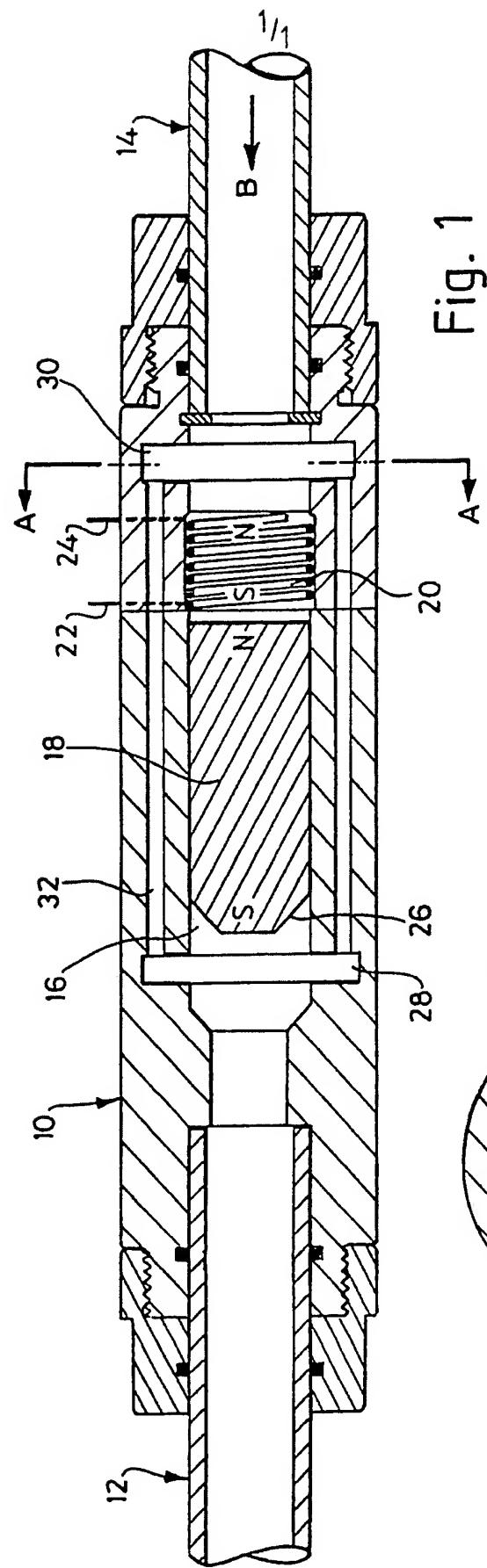


Fig. 1

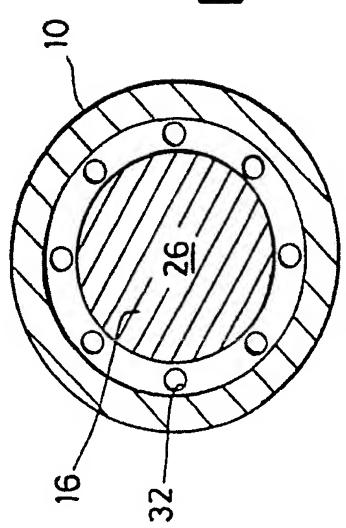


Fig. 2

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Title: Vehicle disabling device

Field of invention

This invention concerns vehicle disabling devices and is applicable to motor vehicles such as cars, vans, lorries, motorcycles, buses, coaches and the like and is equally applicable to powered water craft such as powered boats, jetskis and the like and aircraft including hovercraft, and to this end the word vehicle is intended to cover any of the aforesaid.

Background to the invention

Various proposals have been made to render motor vehicles and powered boats less easy to steal and drive away. Thus some entail hidden switches and interlocks by which the ignition or starter motor connections are interrupted and can only be re-instated by an authorised driver who knows what to do and where to find the switches.

It is an object of the present invention to provide an alternative vehicle immobilising device which does not need the vehicle electrics to be interfered with.

Summary of the invention

According to the present invention valve means is provided, adapted to be fitted at any convenient point in the fuel line supplying fuel from the fuel tank to the engine, which valve means is normally in a closed state

but can be actuated into an open state to permit the flow of fuel therethrough by an authorising procedure.

According to a preferred feature of the invention interlock means is provided by which the valve means cannot be opened until some act is done by the person in charge of the vehicle.

In one arrangement a hidden switch may be provided which must be operated before the valve means will open.

In another arrangement a keypad and logic circuit means may be provided which only generates an actuating signal after a sequence of digits has been entered correctly on the keyboard.

In another arrangement a smart card may be employed and the vehicle may be fitted with a card reader and the valve is only opened after the correct smart card has been inserted therein.

It will be appreciated that these are merely examples of various authorising procedures which may be incorporated and others may be used and any combination of the aforementioned or any other authorising procedures may be employed in combination either in sequence or in parallel to make up the authorising procedure and all such combinations and steps fall within the scope of the present invention.

According to another preferred feature of the invention the valve means is electromagnetically operated.

In a preferred embodiment the valve comprises an outer

sleeve adapted at opposite ends to be sealingly secured in a vehicle fuel line and slidably therein an elongate piston having permanent magnet properties and magnetised so that its magnetic field is parallel to its longer dimension. The wall thickness of the sleeve is preferably such as to accommodate a circular array of drillings through which fuel can flow and which are shut off when the piston occupies one end position within the sleeve within which it is a close slipping fit. A coil of wire is located around the region of the sleeve within which the piston can slide, the region being defined by an end stop at which the drillings are shut off by the piston at one end of its travel, and second end stop at the other end of its travel in which second piston the fuel can pass through the drillings and therefore through the valve body from the input to the output thereof.

Movement of the piston is effected by energising the coil with an electric current. Typically direct current from a vehicle battery is employed.

The sleeve may be made from any suitable non-magnetic material such as aluminium or an alloy thereof or from a plastics material.

According to a particularly preferred feature of the invention the valve may be located within a fuel tank provided the electrical circuit is rendered flame-proof and spark-proof.

The invention will now be described by way of example, with reference to the accompanying drawings in which:

Figure 1 is a side view in section of a valve embodying

the invention, and

Figure 2 is a cross-section view on the line AA.

Detailed description of drawings

As shown the valve is a generally cylindrical housing 10 typically of aluminium or a plastics material and is adapted at opposite ends by means of reduced diameter coupling pipes 12 and 14 to be fitted in a petrol or diesel fuel line supplying fuel to an engine (not shown). The fuel can flow in either direction.

The interior of the sleeve is a smooth cylindrical bore 16 within which a solid permanent magnet piston 18 is slidable. Fitted into the bore of the sleeve is a coil of wire 20 having connections 22, 24 by which current can be caused to flow through the coil. The polarity and/or winding direction are selected so that when energised the coil attracts the piston to the right hand end of the sleeve as shown in the drawing.

The left hand end of the piston 18 is formed as a truncated cone at 26 and the end of the bore within which the piston slides is formed with a similar female cooperating profile. A manifold is created at each end of the bore 16 by means of annular grooves 28 and 30.

Typically liquid entering the device as shown passes along pipe 14, enters the manifold 30 and since its passage along the bore is blocked by the piston 18 (which is sealingly engaged within the bore) the fuel will be forced to flow along the circular array of drillings 32 to enter the manifold 28 and exit via the small diameter passage

34, 36 to the engine.

If fuel is supplied along line 14 under pressure as from a fuel pump, the force acting on the right hand end of the piston will cause the piston to slide in a leftwards sense as shown which results in the manifold 28 becoming closed as the piston extends thereover. With the radial groove 28 shut off, fuel cannot flow through the valve and the pressure built up to the right hand side of the piston 18 by the fuel pump ensures that the valve remains closed.

If the coil 20 is now energised so as to produce an appropriate magnetic field, the piston 26 will be attracted to the right hand end of its travel albeit against the pressure of the incoming fuel but as soon as the piston clears the left hand end, fuel can flow through the passages 32 and into and through the manifold 28 to exit through the pipe 12.

An alternative arrangement would be to reverse the polarity of the coil by switching, thus preventing the flow of fuel until such time as a counter switch be employed.

The current supply for the coil 20 is controlled by a hidden switch which when operated energises the coil and thus permits fuel to pass to the engine.

In a more sophisticated arrangement the operation of the coil may be under the control of a radio or infra-red or audio transmitter/receiver arrangement.

In an even more sophisticated arrangement the switching of current to the coil may be interlocked with a vehicle

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alarm system where fitted so as to prevent the flow of fuel to the engine if the vehicle alarm has not been disarmed in the correct manner.

Claims:

1. A vehicle immobilising device comprising valve means adapted to be fitted at any convenient point in the fuel line supplying fuel from the fuel tank to the engine of the vehicle wherein, when the vehicle is not in use, the valve means when installed, is in a closed state, in which state fuel is prevented from being supplied along the fuel line, but can be actuated into an open state to permit the flow of fuel therethrough by an authorising procedure.
2. A vehicle immobilising device in which the actuation of the valve means is governed by interlock means by which the valve means cannot be opened until some act is done by the person in charge of the vehicle.
3. A vehicle immobilising device according to claim 2 in which the interlock means comprises a hidden switch which must be operated before the valve means will open.
4. A vehicle immobilising device according to claim 2 or claim 3 in which the interlock means includes a keypad and logic circuit means which generates an actuating signal for opening the valve if a sequence of digits has been entered correctly on the keyboard.
5. A vehicle immobilising device according to any of claims 2 to 4 in which the interlock means includes a card reader for a smart card, the card reader being so arranged as to prevent the valve from being opened if the correct smart card is not inserted into the reader.

6. A vehicle immobilising device according to any one of the preceding claims in which the valve means is electromagnetically operated.

7. A vehicle immobilising device according to any of the preceding claims in which the valve means comprises a valve adapted to be located within a fuel tank.

8. A valve for use as the valve means for a vehicle immobilising device according to any of the preceding claims, the valve comprising a sleeve adapted at opposite ends to be sealingly secured in a vehicle fuel line and an elongate piston slideably received in the sleeve and having permanent magnet properties such that its magnetic field is parallel to its longer dimension, a coil of wire situated in the region of the sleeve in which the piston can slide, the piston being slideable between an open position in which fuel can pass through the sleeve and a closed position in which the passage of fuel is prevented, the device including coil means for moving the piston in the sleeve so as to actuate the valve.

9. A valve according to claim 8 in which the sleeve includes a circular array of drillings through which fuel can flow when the piston is in the open position and which are shut off when the piston occupies the closed position.

10. A valve according to claim 8 or claim 9 in which the range of allowable movement of the piston in the sleeve is defined by a first end stop at which the drillings are shut off by the piston at one end of its travel, and second end stop at the other end of its travel, in which

second position the fuel can pass through the drillings.

11. A vehicle immobilising device according to any of claims 1 to 7 which the valve means comprises a valve according to any of claims 8 to 10.

12. A vehicle immobilising device according to claim 11 in which the card means is, in use, energised by direct current from the vehicle battery.

13. A vehicle immobilising device substantially as described herein with reference to, and as illustrated in the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

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(ii) Int Cl (Ed.5) B60R 25/04, F16K 31/06, 31/08

Search Examiner
R J DENNIS

Date of completion of Search
13 OCTOBER 1993

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
1-7 and 11-13

Categories of documents

X: Document indicating lack of novelty or of inventive step.
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.
A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.
E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X, Y	GB 2200086 A	(CHANDLER)	X: 1, 2, 4, 6 and 7 Y: 11 and 12
X, Y	GB 1592454	(WASLEY)	X: 1-3 and 6 Y: 1 and 12
Y	GB 1317381	(DAIMLER)	11 and 12
X	GB 1171773	(BEAL)	1 and 2 at least
X	WO 89/11979 A1	(NIELSEN)	1, 2, 4, 6 and 7 at least
X	US 5168957	(ROSS)	1 and 2 at least
X	US 4884207	(AISIN)	1 and 2 at least
The above specifications are examples of many similar.			

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).